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accompany the internal processes going on in the system. The sensorium is the more sensible to the impressions made by these internal causes, inasmuch as all the avenues to external impressions are closed, and the mind is deprived of the control it exercises, during its waking hours, over the train of its thoughts, by the help of the perceptions derived from the senses, and the employment of words for detaining its ideas, and rendering them objects of steady attention, and subjects of comparison.

March 14, 1833.

The Rev. WILLIAM BUCKLAND, D.D., Vice-President, in the Chair.

A paper was read, entitled, "On the Figures obtained by strewing Sand on Vibrating Surfaces, commonly called Acoustic Figures." By Charles Wheatstone, Esq. Communicated by Michael Faraday, Esq. D.C.L. F.R.S.

The author, after adverting to the imperfect notice taken by Galileo and by Hooke of the phenomena which form the subject of this paper, ascribes to Chladni exclusively the merit of the discovery of the symmetrical figures exhibited by plates of regular form when made to sound. He proposes a notation, by means of two numbers separated by a vertical line, for expressing the figures resulting from the vibrations of square or rectangular plates. He gives a table of the relative sounds expressed both by their musical names and by the number of their vibrations, of all the modes of vibration of a square plate, as ascertained by the experiments of Chladni. He then proceeds to class and analyse the various phenomena observed under these circumstances, and shows that all the figures of these vibrating surfaces are the resultants of very simple modes of oscillation, occurring isochronously, and superposed upon one another; the resultant figure varying with the component modes of the vibration, the number of the superpositions, and the angles at which they are superposed. In the present paper, which forms the first part of his investigation, he confines himself to the figures of square and other rectangular plates.

The author finds that the principal results of the superposition of two similar modes of vibration are the following:—first, the points where the quiescent lines of each figure intersect each other remain quiescent points in the resultant figure; secondly, the quiescent lines of one figure are obliterated, when superposed, by the vibratory parts of the other; thirdly, new quiescent parts, which may be called points of compensation, are formed whenever the vibrations in opposite directions neutralize each other; and, lastly, at other points, the motion is as the sum of the concurring, or the differences of the opposing vibrations at these points. After considering various modes of binary superposition, the author examines the cases of four co-existing superpositions.

When the vibrations of the superposed modes are unequal in intensity, there is formed a figure intermediate between the perfect re-

sultant and one of its compounds. These figures the author denominates *imperfect resultants*.

In each series of transitions there are certain points which are invariable during all the changes: these are quiescent points, formed by the nodal lines of one figure intersecting those of the other, and the centres of vibration, where the maxima of positive or negative vibration agree in each component mode of vibration. The points of compensation are changeable. Transitional figures appear when the sides of the plate are nearly, but not exactly, equal.

The author next considers the figures obtained on square plates of wood and other substances, having different degrees of elasticity in different directions. He concludes this part of his paper by an account of some optical means of representing the figures noticed by Chladni.

March 21, 1833.

WILLIAM GEORGE MATON, M.D., Vice-President, in the Chair.

A paper was read, entitled, "An Account of two cases of inflammatory Tumour produced by a deposit of the Larva of a large Fly (*Æstrus humanus*) beneath the Cutis in the Human Subject; accompanied with Drawings of the Larva." By John Howship, Esq. Communicated by Charles Hatchett, Esq. F.R.S.

The first of these two cases is that of a soldier stationed on the banks of the Marawina river in Surinam, who had a large boil on the back, from which a maggot was pressed out. The second case, which occurred at Santa Anna, in the district of Maraquita, in Columbia, is that of a carpenter, who had for some months a large boil on the scrotum, from which a living larva was extracted. A description of this larva, drawn up by Mr. Curtis, is given by the author, together with a drawing of the specimen. The author proposes giving to it the name of the *Æstrus humanus*.

The reading of a paper, entitled, "Experimental Researches in Electro-magnetism," by the Rev. William Ritchie, LL.D. F.R.S. was commenced.

March 28, 1833.

The Rev. JAMES CUMMING, M.A., Vice-President, in the Chair.

The reading of Dr. Ritchie's paper was resumed and concluded.

This communication consists of three parts. In the first part the author shows that the common deflecting galvanometer, in which the deflecting forces are assumed to be as the tangents of deflection, is founded on false principles, and consequently leads to erroneous results. The wire forming the coil is of considerable thickness, and therefore there is no fixed zero from which the deflections can be reckoned. The length of the coil, also, being generally short, occa-